Cummins 6.7L CM2100A CSP[5] User Guide

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Cummins 6.7L CM2100A CSP⁵ User Guide

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Contents

Introduction

This document is intended to assist EFILive customers with the basic operations and steps necessary to setup EFILive's CSP^5 custom operating system for the Cummins CM2100A ECM.

Additional Support Resources

If after reviewing this guide further assistance is required please contact the EFILive Authorised Reseller from whom you purchased your product. They are your first point of contact for EFILive support related inquiries.

If your question is in relation to the actual tuning of your vehicle (i.e. how to gain performance, economy etc.) then please ask these questions on the EFILive Forum (http://forum.efilive.com/). EFILive does not provide support or assistance for the actual tuning of any supported vehicles.

Software Version Overview

EFILive presently has two major software versions (V8 and V7) that service different parts of the tuning and scanning process. The V8 software is undergoing significant development and will eventually supersede V7 entirely for FlashScan V2 customers. For the moment, however, both versions are required.

The following is a brief view of the activities that are performed with the different software versions:

Software Version	Purpose
V8	- Reads and Flashes the Dodge Cummins ECM - Maintaining the bootblock and firmware versions on the EFILive FlashScan V2 and AutoCal devices. - Configuration of FlashScan V2 and AutoCal devices for CSP^5 tune switching and EDA data loggiing - Standalone logging to FlashScan / Autocal.
V7	- Modifications to the ECM calibration are made using the V7 Tune Tool application. The modified calibration is then flashed into the ECM (again using V8). - Logging of real time data from the vehicle is done using the V7 Scan Tool application.

What is EFILive CSP^5 ?

EFILive's CSP^5 custom operating system for the Cummins CM2100A ECM allows customers to be able to switch 'on the fly' between 6 different tunes, all stored in the ECM's flash memory.

There are five tunes accessible through CAN bus switching, and a sixth tune that is switched using an input on one of the ECM's connectors.

Having multiple tunes instantly accessible means changing tunes to suit different driving conditions no longer requires the ECM to be reflashed each time you choose to run a different tune. (e.g. racing, towing, or power limiting.) Simply build up all the tunes you need, flash the ECM once and then select your desired tune through your EFILive hardware (or other approved switching devices) at any time.

There is also the ability to have user defined control over an output pin on the ECM should you need to switch a relay or warning lamp under certain operating condition.

CSP^5 delivers scanning enhancements to customers via Enhanced Data Acquisition (EDA). EDA, EFILive's custom scanning mode is the first of its kind and aims to simplify the task of information sharing between users as every individual data parameter has been selected with tuning feedback in mind. EDA allows customers to log 45 individual data parameters specifically chosen to complement tuning at up to 50 frames per second for V8 BBL & V7.5 pass through logging.

EDA scanning is only available on CSP^5 upgraded ECM's.

CSP[5] Upgrade Checklist

In order to upgrade your existing tune to CSP[5], there are some things you need to check first.

1. EFILive has made CSP[5] conversions only for certain factory ECM Operating Systems (OS's), most (if not all trucks) will have been updated at the dealership to one of these later OS's at some point. If you come across a truck that has not, you will need to upgrade your base file first if the truck is not running one of the OS's below. **EFILive will not be offering CSP[5] on older or obsolete OS's.**

   Below is a list of the OS's available for CSP[5] upgrading (* = Not released).

Operating System #	
11520902	11620606 *
11551031 *	11620807
11551032 *	11710806
11551035	11720604 *
11610805	11720606 *
11620604 *	11720809

2. If the truck has had a different tuner on it in the past (i.e. not EFILive) then the conversion process may fail. EFILive highly recommends customers source a good known base file for CSP[5]. This may involve either a dealer flash, or obtaining a suitable file from your chosen tuner.

   EFILive cannot always detect the presence of other tuners in files, if a situation occurs where EFILive's modifications 'clash' with other tuners modification it might result in a bricked 'brain dead' ECM that cannot be recovered.

3. You have to be running the following (or higher) software versions.
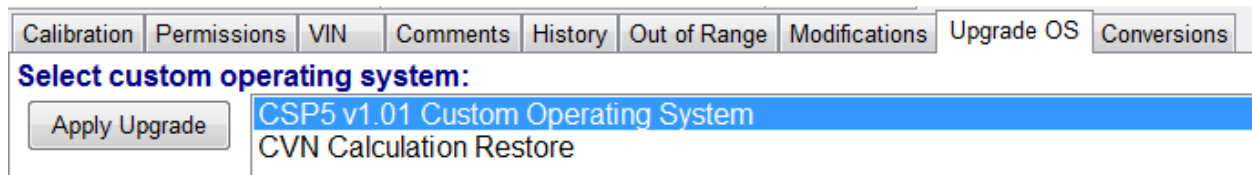
   1. EFILive V8.2.2.259 or later
   2. FlashScan V2 / AutoCal Firmware - V2.07.65
   3. EFILive V7.5.7.263 or later

   The latest software versions are available for download from EFILive's website.

Upgrade Operating System to CSP^5

Important: Ensure your FlashScan V2 / AutoCal is plugged in to the PC's USB port prior to starting V7.5.

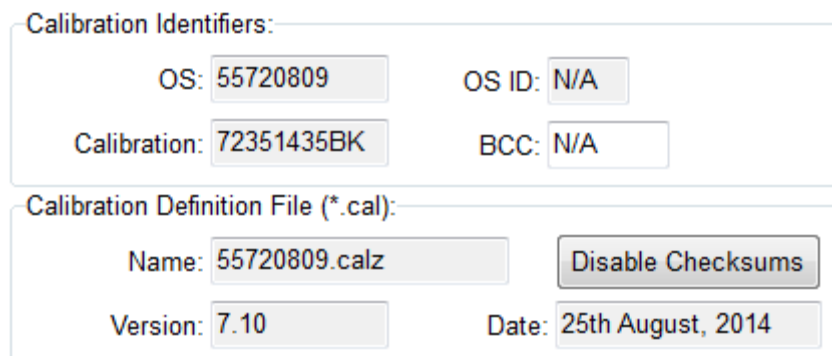Using the EFILive V7.5 Tuning Tool, open your tune and click on the 'Upgrade OS' tab.

Select the 'CSP^5 v1.01 Custom Operating System' option and click on the 'Apply Upgrade' button, you will then be asked to confirm the operation.

Save the file with a new name, *File > Save As*. Maybe something like...
'My Truck Base CSP5 Conversion.ctz' .

Once the file has been saved with its new name, close the file down, *File > Close Tuning File*.
Reopen the file so EFILive will recognise the file is a CSP^5 converted operating system. Please also take note of the new operating system (OS) number of the CSP^5 converted file. Eg, 11720809 now becomes 55720809

EFILive automatically populates the new CSP^5 tables with factory pickup truck values during the upgrade to get you started. On modified engines these may not be suitable settings, you may need to copy your own tables in to the new CSP^5 section(s).

Any existing tables from your old converted tune are now located in the "CSP^5 Program #5" folder.

Once you have made the necessary changes to your individual tunes you can reflash the ECM using V8 Scan and Tune as you normally would flash a Cummins ECM.

Please Note: CSP^5 tunes cannot be read out of the ECM once flashed in.

Tune Features of CSP[5]

All tune features of CSP[5] are accessible via the V7 Tune Tool application.

Tune Switch Password

Users may restrict tune selection by adding a password to move between tune selections to prevent unauthorized switching between tunes 1 to 5.

Before switching between tune selections, users would need to enter in the password (1 to 9999). If the password is correct, the tune will switch, if it is incorrect the tune will not switch.

It should be noted that not all switching devices may support this function, however EFILive's own FlashScan V2 and AutoCal hardware does.

To enable the tune switch password, users need to input their chosen password in the calibration. As the calibration description states, if the password = 0 then there is no password prompt given to the user when switching tunes.

NOTE: Tune switch password will not restrict the activation of CSP[5] Tune 6, Switch via ECM Input (labelled CSP[5] Program Switched).

CSP[5] Output Driver

The CSP[5] custom OS allows you to reconfigure the 'Intake Air Heater" (IAH) Output for other purposes that may be useful for racing, such as turning on a shift light, or turning on or off a relay under certain conditions.

Each controlling parameter can be enabled or disabled. For example if you only wanted to have a warning lamp come on above 3,000 RPM and above 45 MPH you would enable both those parameters and set the values accordingly.

As this function shares the same output as the factory IAH circuits you should not use this function if the vehicle still has this fitted. To ensure you don't accidentally enable these functions with the IAH system still in place you must also let the ECM know the IAH system is not fitted. This is done by setting the calibration *'{F1185} Intake Air Heater Option'* to disabled.

Only use the CSP[5] Output Driver if the IAH system had been removed.

The output is on (Connector #2, Pin 55), when turned on the ECM applies 12V to this output, so if you are wiring in a relay or lamp the other wire needs to be connected to Negative (Ground).

Connector #2 is usually the one above the part number stickers on the ECM with a Brown and Yellow wire already connected (the IAH control).

CSP[5] CAN Tunes

The CSP[5] tunes labelled "Program #1 to Program #5" are all switched via a device on the CAN bus.

Each one of these programs has duplicate sets of tables for you to alter. Program #1 to Program #4 has some 'stock' values inserted in to the maps; Program #5 contains the values you already had in the standard OS maps prior to the CSP[5] conversion.

When the CSP[5] OS conversion is performed the new tables are populated with maps from a standard pickup truck, these may not be suitable for your vehicle, especially if it is a Cab and Chassis (C & C) vehicle, please review and change as necessary the default maps in all the CSP[5] tunes before starting and driving the vehicle.

It should be noted that whenever the ECM is reflashed it will default to using CSP[5] Program #1.
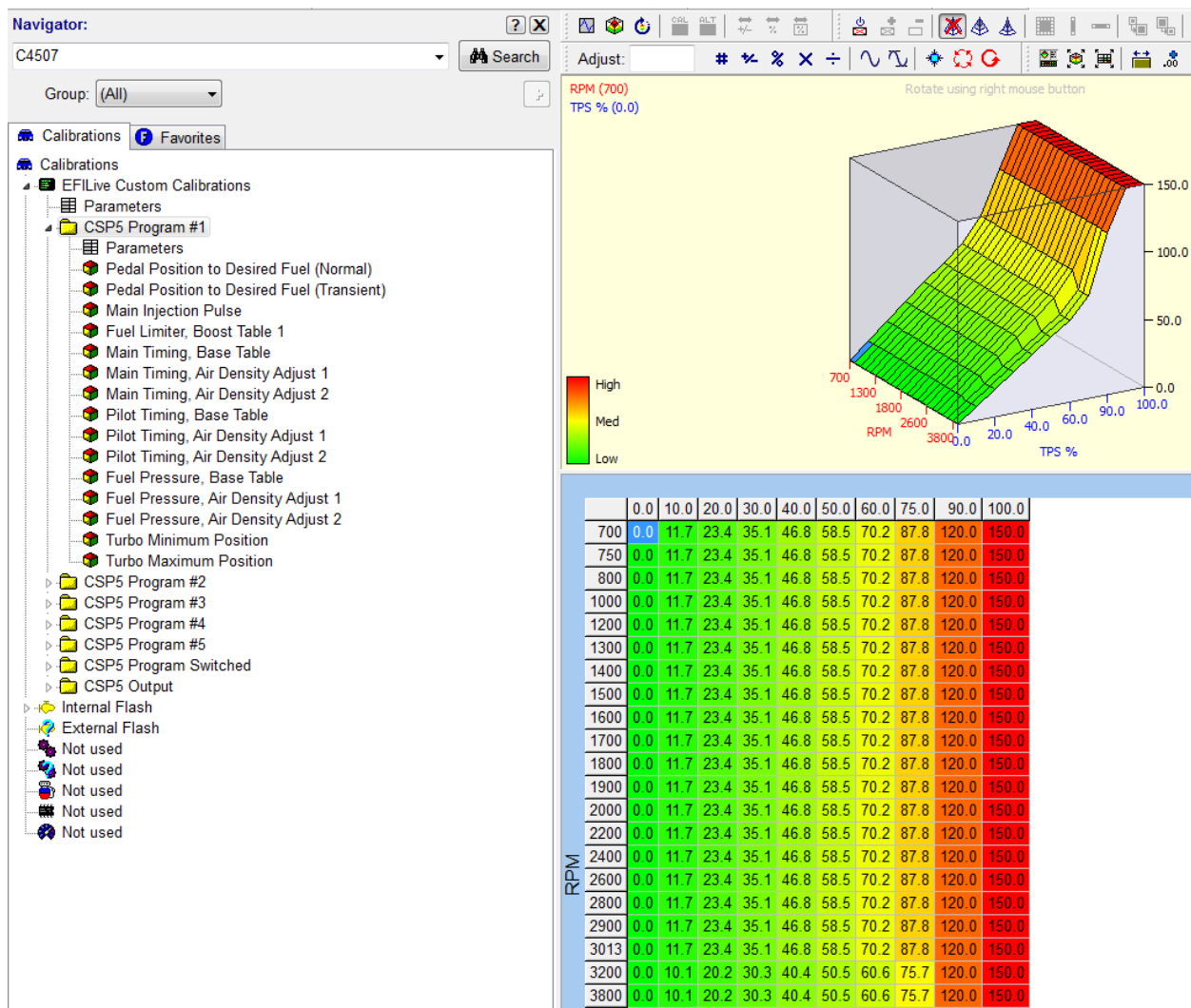
CSP[5] Tune 6 - Switch via ECM Input

The CSP[5] OS also has the provision for one tune to be switched via a spare input pin on the ECM rather than the CAN bus.

When the ECM detects a ground signal on ECM plug C2, pin 16 it will switch to this tune. This tune will override all CAN based CSP[5] programs, even when the tune switch password is active. When the switch is not grounded the ECM will revert to the previously selected CAN based CSP[5] tune.

This function may be useful in racing situations where you only want a certain tune to become activated when something else switches, for example a Nitrous relay. When the Nitrous relay is grounded the ECM will automatically change to this tune for you.

Important: This input is shared with the 'Stationary Remote Power Takeoff (PTO)" in-cab switch, if the truck is fitted with the PTO option this tune will become active with the in-cab PTO activation. (e.g. 3500/4500/5500 Chassis Cab with option PTO Prep Package "LBN"). The PTO will still function as normal but these CSP tables will be used.
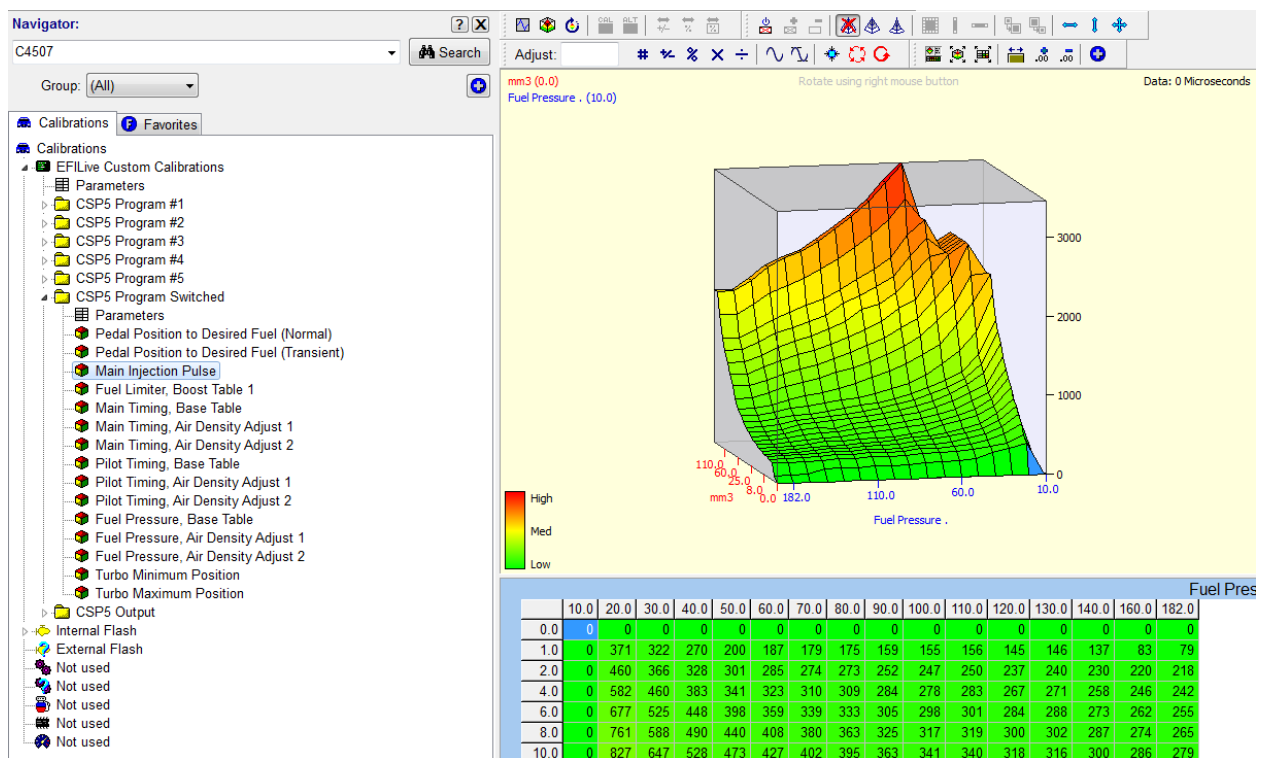
CSP[5] Min/Max Turbo Position Control

The CSP[5] OS control of the Turbo Vane Positions is slightly different to the normal factory method.

Instead of 4 altitude based min/max position tables there is just a single minimum and maximum position table per CSP tune. You must select to use either the four factory min/max tables or the single min/max table in each CSP tune position.
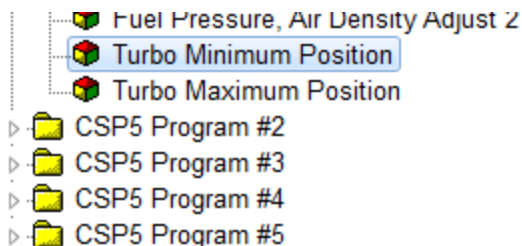
This parameter can be found at the top of the navigation tree for each CSP tune
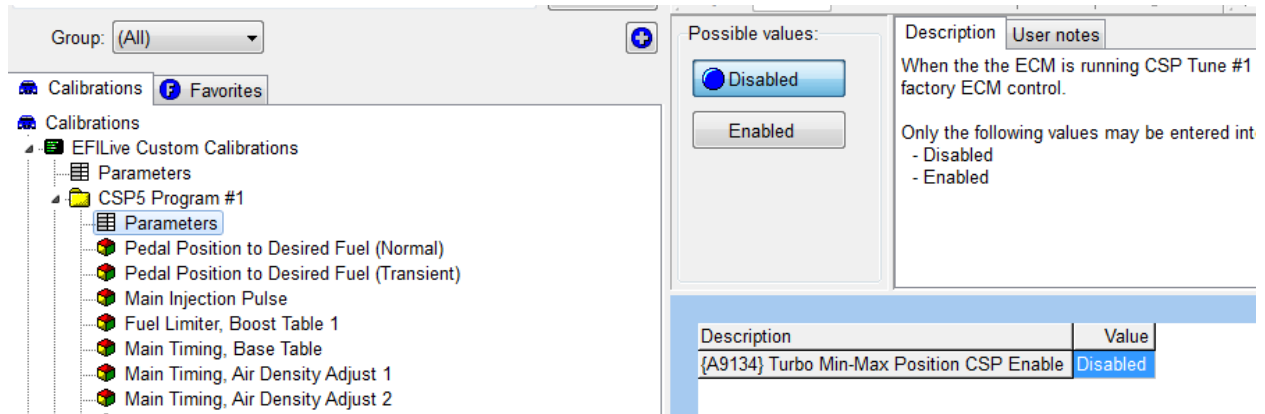
If set to 'disabled' then the ECM will continue to use the tables below for that CSP tune.
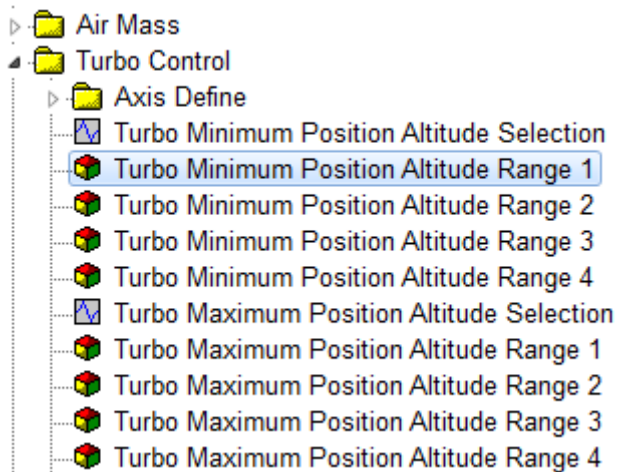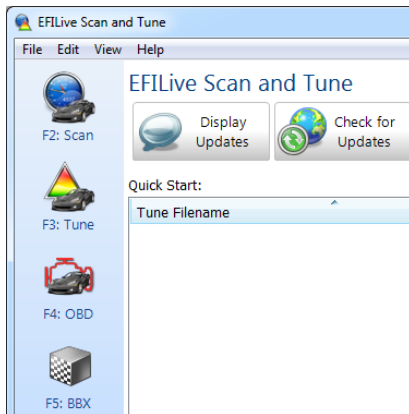

If 'enabled' for a particular CSP tune then it will use the single tables below (Tune #1 example) and ignore the four factory min/max tables.
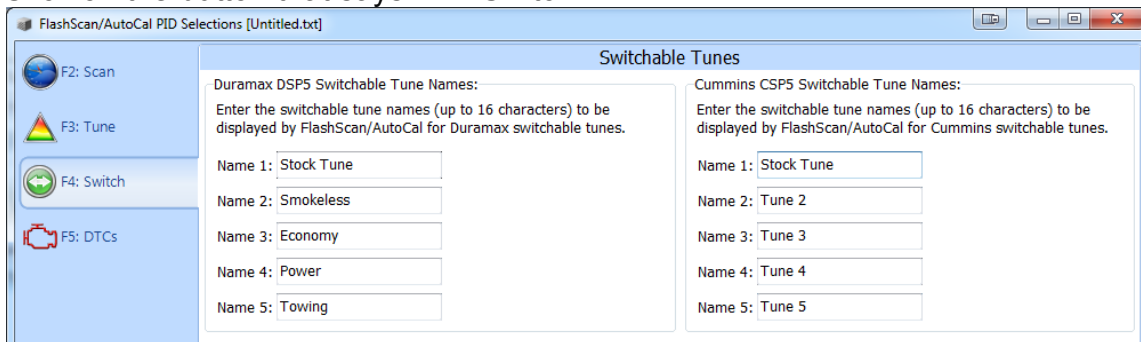
Setting up FlashScan V2/AutoCal for CSP^5 using V8 Scan and Tune

Tune Switching

With your FlashScan V2/AutoCal plugged in to a USB port, open up V8 Scan and Tune and click on the 'F5: BBX' option.

Click on the button that says "F4: Switch"

Enter in the Tune names as they will appear on the FlashScan V2/AutoCal LCD screens.

To switch tunes after powering off your FlashScan V2/AutoCal, the 'CMC' PID group needs to be selected. If you do not do this, switching will fail until the CMC PID group is selected. To automate this function each time FlashScan V2/AutoCal is powered on, in V8 click on F6: Devices, then F6: Logging and tick the box that gives the option to automatically re-select PID list, as shown below.
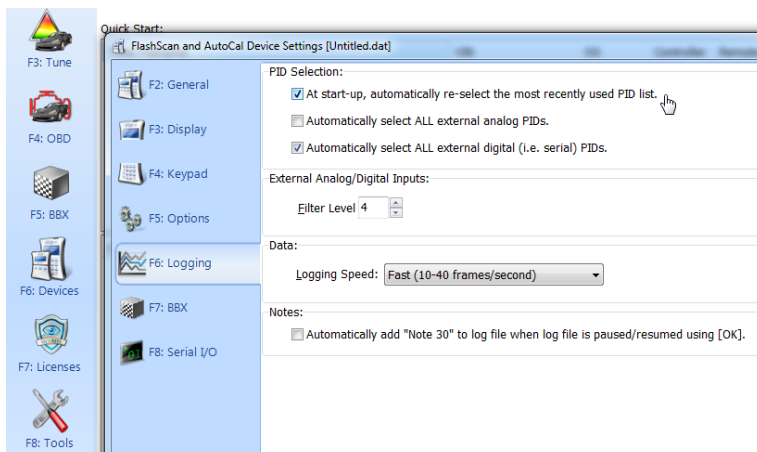
EDA Data Logging

Remove any existing PID groups for the 6.7L Cummins previously selected to ensure the scan rates remain as high as possible.

The EDA PID group aims to simplify the task of information sharing between users as every individual data parameter has been selected with tuning feedback in mind. If you choose to log additional data streams alongside the EDA stream it may slow the data logging rate down by as much as 70%.

Below is what a blank FlashScan V2/AutoCal would look like, it's ok to have PID groups already in there for other controllers, however for maximum scan rates existing 6.7L CMC PID groups should be removed.
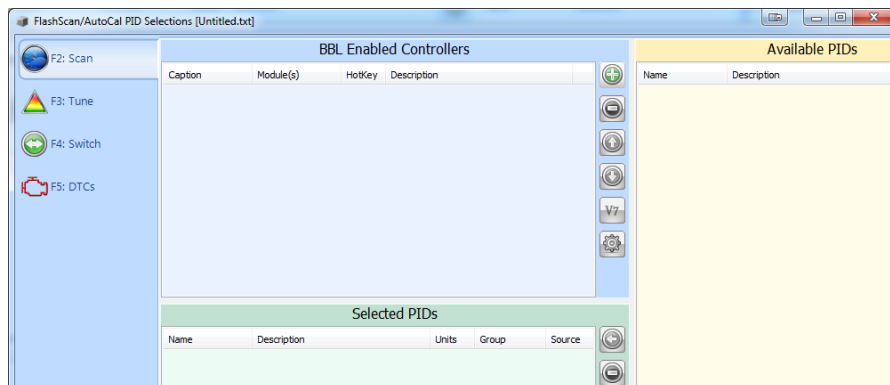
To add the CMC controller to your list;
- Press the green '+' icon, which will open a second window where you can choose the controller types, or
- Right click on the first window and select 'CMC CM2100 Cummins Diesel ECM', then press OK.
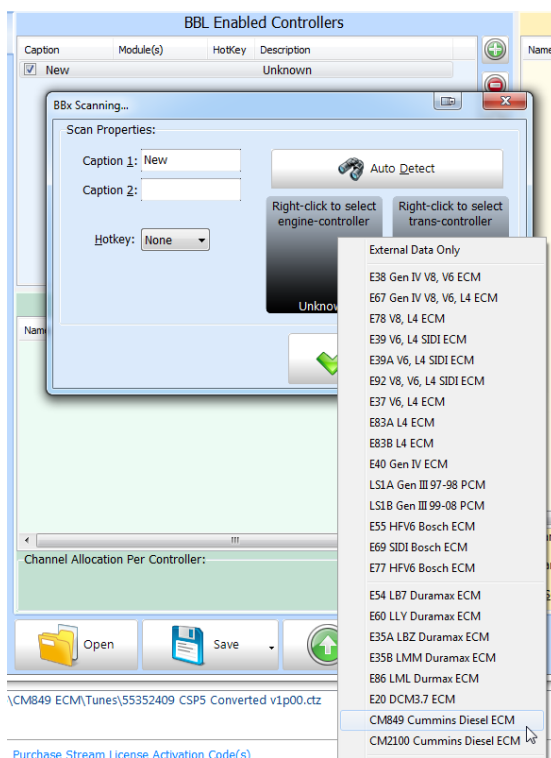
Click on the CMC Enabled Controller, then the EDA 1 sub folder, as per the screen below.

Hold the left mouse button down on the EDA 1 folder icon and drag it in to the 'Selected PIDs' window. This will copy over all the EDA 1 PID's within that folder.

BBL Enabled Controllers						Available PIDs	
Caption	Module(s)	HotK...	Description		Name		Description
☑ E20	E20		E20 Delphi DCM3.7AP Diesel ECM		▷ EDA 1		Enhanced Data Acquisition 1
☑ CMB	CMB		CMB CM849 Cummins Diesel ECM		▷ Generic 1		General
☑ CMC	CMC		CMC CM2100 Cummins Diesel ECM		▷ Generic 2		Pressures and Temperatures
					▷ Generic 3		Instrumentation
					▷ Generic 4		Emissions Compliance
					▷ Enhanced 1		Fuel Balance Rates
					▷ Enhanced 2		Pedal, Water in Fuel, Baro
					▷ Enhanced 3		Boost, RPM, Temperatures
					▷ Enhanced 4		Air Temp, Battery
					▷ Enhanced 5		Fuel Pressure, Speed, A/C, Trans Temp
					▷ Enhanced 6		Timing, Engine Status, Idle
Selected PIDs					▷ Enhanced 7		Fuel, Injectors
					▷ Enhanced 8		Variable Geometry Turbo
Name	Description		Units	Group	▷ Calculated		Calculated PIDs
					▷ Analog		External Analog PIDs
					▷ Digital		External Digital/Serial PIDs
					▷ Dyno		Mainline Dyno PIDs
					▷ FPE		Fleece Performance XDL PIDs
					▷ FPE1		Fleece Performance XDL2 PIDs
					▷ FPE2		Fleece Performance UIO PIDs

After copying...

BBL Enabled Controllers						Available PIDs	
Caption	Module(s)	HotK...	Description		Name		Description
☑ E20	E20		E20 Delphi DCM3.7AP Diesel ECM		▷ EDA 1		Enhanced Data Acquisition 1
☑ CMB	CMB		CMB CM849 Cummins Diesel ECM		▷ Generic 1		General
☑ CMC	CMC		CMC CM2100 Cummins Diesel ECM		▷ Generic 2		Pressures and Temperatures
					▷ Generic 3		Instrumentation
					▷ Generic 4		Emissions Compliance
					▷ Enhanced 1		Fuel Balance Rates
					▷ Enhanced 2		Pedal, Water in Fuel, Baro
					▷ Enhanced 3		Boost, RPM, Temperatures
					▷ Enhanced 4		Air Temp, Battery
					▷ Enhanced 5		Fuel Pressure, Speed, A/C, Trans Temp
Selected PIDs					▷ Enhanced 6		Timing, Engine Status, Idle
					▷ Enhanced 7		Fuel, Injectors
Name	Description		Units	Group	▷ Enhanced 8		Variable Geometry Turbo
VSS_F	Vehicle Speed		km/h	EDA	▷ Calculated		Calculated PIDs
CMDFUELU_F	Main Injection Quantity Uncompensated		mm3	EDA	▷ Analog		External Analog PIDs
INJTIM_F	Main Injection Timing		°	EDA	▷ Digital		External Digital/Serial PIDs
AIRDENL_F	Air Density Table Select Low		count	EDA	▷ Dyno		Mainline Dyno PIDs
AIRDENH_F	Air Density Table Select High		count	EDA	▷ FPE		Fleece Performance XDL PIDs
TP_F	Driver Throttle Position		%	EDA	▷ FPE1		Fleece Performance XDL2 PIDs
FDRATE_F	Fuel Delivery Rate		g/s	EDA	▷ FPE2		Fleece Performance UIO PIDs
TURBOSPD_F	Turbo Speed			EDA			
BOOSTG_F	Boost Pressure Gauge		kPa	EDA			
CAT1TEMP_F	Catalyst Temp Sensor 1		°C	EDA			
MAFFLOW_F	MAF Sensor Flow		g/s	EDA			
TURBOPOS_F	Turbo Commanded Position		%	EDA			
ENGLOAD_F	Engine Load		%	EDA			
CMDFUELB_F	Main Injection Quantity with Balance Rates		mm3	EDA			
RPM_F	Engine RPM		rpm	EDA			
POSTINJQ_F	Post Injection Quantity		mm3	EDA			
POSTINJT_F	Post Injection Timing		°	EDA			
MAININJD_F	Main Injection Duration		us	EDA			
PILOTINJD_F	Pilot Injection Duration		us	EDA			

Please note: Individual PID's cannot be added / removed from the EDA scan group, trying to do so will not improve logging speeds.

Write this configuration over to the FlashScan V2/AutoCal using the Program function as shown below. To ensure everything is correct, EFILive recommends you should choose the "Program ALL Required Data (Slower)" Option for initial setups.
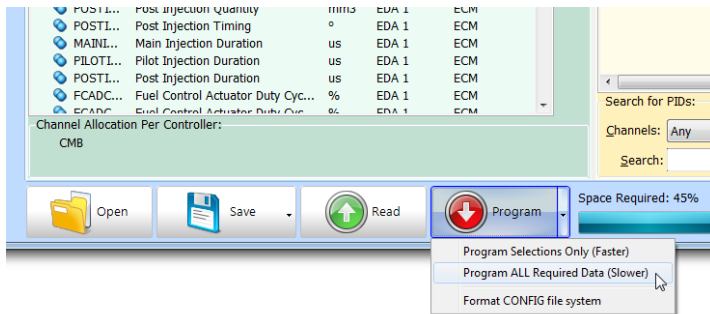

Once the device is programmed, FlashScan V2/AutoCal is configured to log data from the ECM using EDA, as well as switch tunes.

Data Logging with V7.5 Scan Tool

To perform the tasks below you should have your FlashScan V2/AutoCal device connected to your vehicle. Note: Data logging with V7.5 is not supported with AutoCal hardware.

The first thing you need to do is select the correct ECM type to log, in this case the 'CMC CM2100A' ECM is what you need. Select this option and press OK.
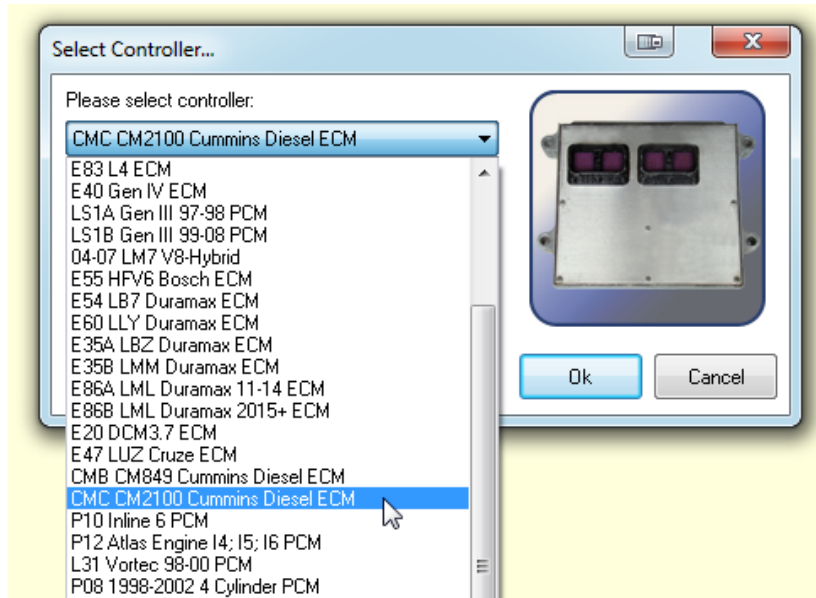
Just like when setting up the V8 PID's you need to make sure that the EDA PID group is the only thing selected before logging. If you have other selections (or warnings like the screenshot below) the logging will either fail to start or be a lot slower than expected.

In the situation like above you should create a new PID selection group, further details on how to do that can be found in the V7.5 user manual, however we will give a quick overview on the following pages.
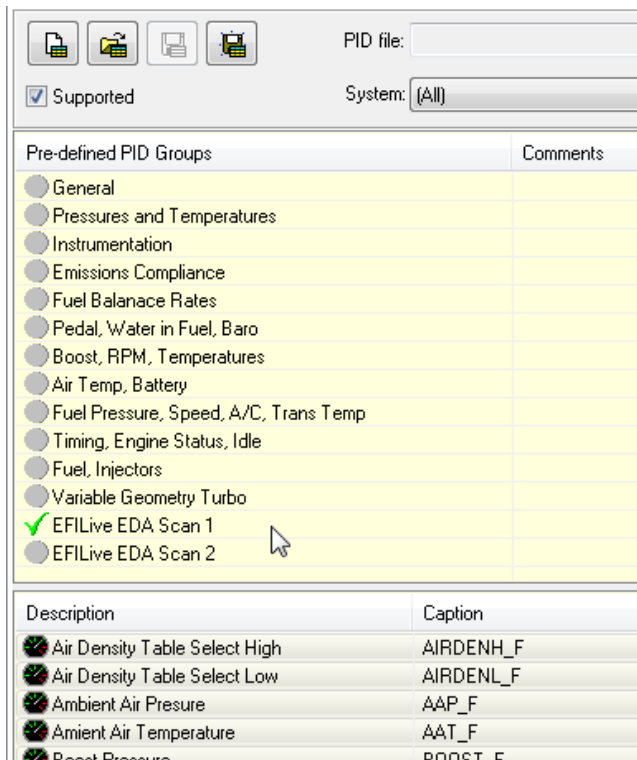
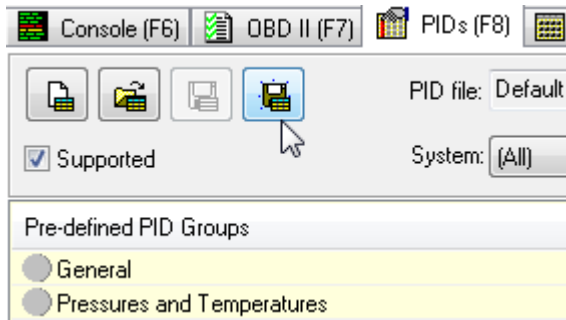First create a new blank PID selection file by clicking the 'Clear Existing PID's' button.
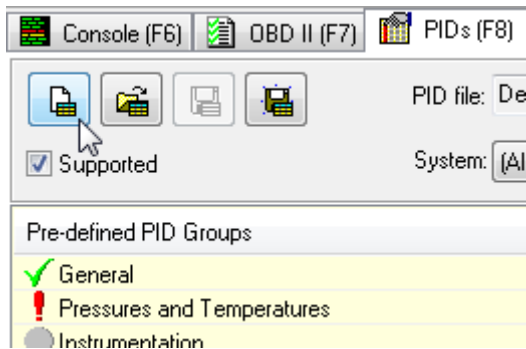
The Pre-Defined PID Groups should now look like this
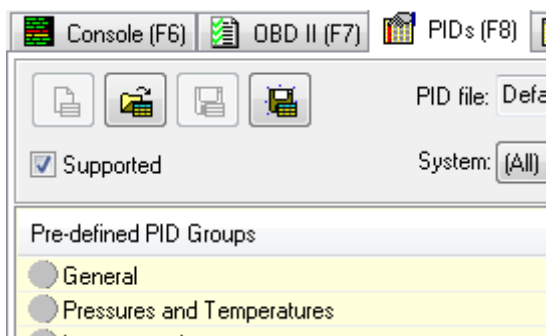
Double click just the 'EFILive EDA Scan 1' PID group.

It would be worth saving this configuration with a new name for easy reference later on. Click on the 'Save PID selection' icon, and rename (eg ' CMC EDA').

You are now ready to monitor or log data from the ECM in real time. Both of these operations can be performed using the Yellow and Red buttons at the bottom of the screen.


Whilst the laptop is connected to the FlashScan V2/AutoCal device and data logging tune switching will not work from the keypad, you have to stop logging first.

Switching Tunes with FlashScan V2/AutoCal

To switch tunes via the FlashScan V2/AutoCal, the device must first be configured for switching, and a CSP[5] tune file flashed into the ECM, as detailed above. Once configured, navigate the menu like so (FlashScan V2 samples shown)...
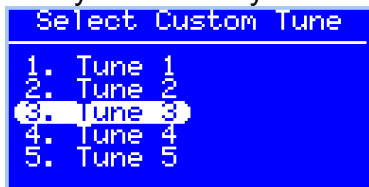
Choose F2 Tune Tool
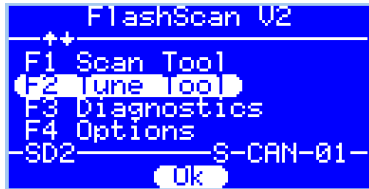
Then F3 Switchable Tunes


Now you will see your Tune Selections.

Simply press the 'Ok' button to select that tune. If it was successful you should see confirmation of that on the screen.

You do not need to reselect the tune once the engine is shut down; the ECM 'remembers' which tune you previously selected.

Occasionally the ECM and FlashScan V2/AutoCal may get out of sync when switching tunes if the trucks ignition was turned off but the FlashScan V2/AutoCal remained powered up.   When this occurs the following message will be displayed on the LCD screen.
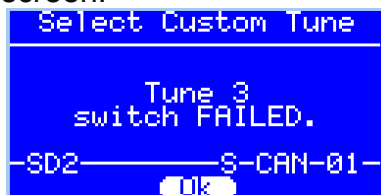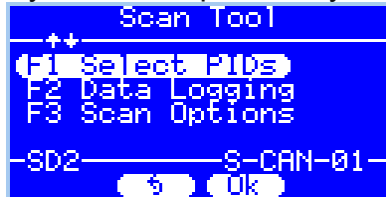

If you do see that error simply try to switch the tune again.

Data Logging with FlashScan V2/AutoCal

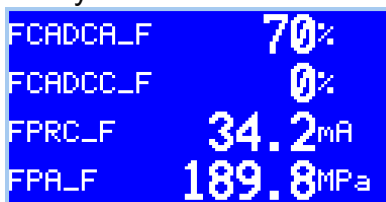From the Main Menu, choose F1 Scan Tool...
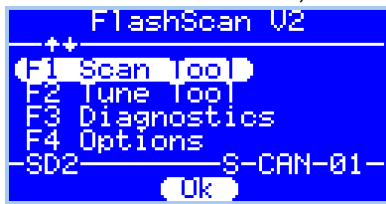
If you haven't previously select the 'CMC' PID's you need to do so...

Then 'CMC' and press Ok

Now you can choose to Record Data or Display Data (display data shown below).

Please note: When data logging is activated you cannot return to the tune selection menu unless logging is stopped.

Integrating CSP^5 with Approved 3rd Party Products

Integration of EFILive's proprietary CSP^5 custom operating system with 3rd party products is restricted to approved providers, many of which are listed on the www.efilive.com website. EFILive recommends that customers confirm that their chosen integration product is approved for use.

To setup an approved integration product, users should:
1. Convert their base file to a CSP^5 operating system, as described in this document.
2. Edit tune parameters as necessary and save the file using the V7 Tune Tool application, as described in this document.
3. Flash their modified file into their ECM using the V8 Scan and Tune application as described in this document. (Specific selection of 3rd party product is NOT required in tune file).
4. Setup the 3rd party device as per the manufacturer's instructions.

Troubleshooting

Should users encounter problems with upgrading to CSP^5 they should:

1. Confirm V7, V8 firmware and bootblock versions match the CSP^5 minimum requirements (listed above) using these instructions Finding FlashScan & AutoCal Bootblock and Firmware versions
2. Confirm CSP^5 file was upgraded to new operating system number, as sequenced above.
3. If you require assistance in reading, flashing or editing tuning parameters on your controller it is recommended you read the Cummins 2006-2009 Quick Start guide which can be found in your V8 installation under documents, or the Documentation section of the EFILive website.
4. If you require assistance in setting up FlashScan V2 or AutoCal standalone features (BBX), it is recommended you refer to the EFILive V8 Reference.
5. If you are concerned your device is not switching between tunes, edit your tunes to see a notable difference (ie Pedal to Desired Fuel table), reflash and then test. Also note the EDA data stream has a parameter that indicates which tune the ECM is running.